

Applicant: Peter BOEHLAND et al.
Docket No. R.305609
Preliminary Amendment

AMENDMENTS TO THE SPECIFICATION:

Page 1, please add the following new paragraphs before paragraph [0001]:

[0000.2] CROSS REFERENCE TO RELATED APPLICATIONS

[0000.4] This application is a 35 USC 371 application of PCT/DE 2004/001302 filed
on June 22, 2004.

[0000.6] BACKGROUND OF THE INVENTION

Please replace paragraph [0001] with the following amended paragraph:

[0001] ~~Prior Art~~ **Field of the Invention**

Please add the following new paragraph before paragraph [0003]:

[0002.5] Description of the Prior Art

Page 2, please delete paragraph [0004].

Please replace paragraph [0005] with the following amended paragraph:

[0005] ~~Particularly~~ **The reasons for embodying fuel injection devices with a plurality of valve elements are that, particularly** in diesel engines, to reduce emissions and enhance efficiency, it is necessary to inject the fuel into the appropriate combustion chambers of the engine in as finely atomized a form as possible. This can be done either by making the injection pressure at which the fuel reaches the fuel injection device high, or increasing the number of fuel outlet openings from which the fuel emerges from the fuel injection device into the combustion chamber and simultaneously reducing the individual cross section of a fuel outlet opening. These provisions make it possible to improve the atomization quality of

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Docket No. R.305609
Preliminary Amendment

the injected fuel streams while simultaneously reducing the droplet diameter of the fuel mist (spray) produced.

Page 3, please replace paragraph [0009] with the following amended paragraph:

[0009] ~~Advantages of the Invention~~

SUMMARY AND ADVANTAGES OF THE INVENTION

Page 6, please delete paragraph [0017].

Please replace paragraph [0018] with the following amended paragraph:

[0018] **Advantageous refinements of the invention are disclosed.** First, it is proposed that the additional valve device has a cylindrical switch body that has a first valve edge, which disconnects the pressure chamber from the low- pressure connection; a second valve edge, which connects the pressure chamber with the high-pressure connection; and a hydraulic control face, which defines the hydraulic control chamber. The additional valve device in this case is accordingly a hydraulic servo valve. Such a valve is technically simple to make and functions reliably. There is no need for additional trigger lines.

Page 8, please replace paragraph [0024] with the following amended paragraph:

[0024] ~~Drawing~~ **BRIEF DESCRIPTION OF THE DRAWINGS**

Applicant: Peter BOEHLAND et al.
Docket No. R.305609
Preliminary Amendment

Page 9, please replace paragraph [0031] with the following amended paragraph:

[0031] ~~Description of the Exemplary Embodiments~~

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Page 10, please replace paragraph [0035] with the following amended paragraph:

[0035] To that end, approximately halfway along its length, the outer valve element 36 has a pressure face ~~38~~ **38a**, whose force resultant points in the opening direction. The pressure face ~~38~~ **38a** defines a pressure chamber 40, which as will be described in further detail hereinafter can be made to communicate, via a conduit 42, selectively with the low-pressure connection 28 or the high-pressure connection 24. An annular chamber 43 leads from the pressure chamber 40 to the lower end, in Fig. 2, and pointing in the installed position into the combustion chamber 22, of the fuel injection device 20; this is shown in detail in Fig. 3.

Page 12, please replace paragraph [0042] with the following amended paragraph:

[0042] In this way, a slide edge 72 is formed between the portions 68a and 68b of the switch body 68. By means of this slide edge, a conduit 74, which is in communication with the low-pressure connection 28, can be opened or closed. Between the portions 68b and 68c, a sealing edge 76 is formed, which cooperates with a slightly conical step 78 located between the portions 33a and 33b of the longitudinal bore 33. If the sealing edge 76 is resting on the step 78, then an annular chamber 80, which is present between the portion 68b of the switch body 68 and the portion 33a of the longitudinal bore 33, is disconnected from an annular chamber

Applicant: Peter BOEHLAND et al.
Docket No. R.305609
Preliminary Amendment

82, which is present between the portion 68c of the switch body 68 and the portion 33b of the longitudinal bore 33. Conversely, if the sealing edge 76 has lifted from the step 78, then the two annular chambers 80 and 82 communicate with one another. The conduit 42 that originates at the pressure chamber 40 discharges into the portion 33a of the longitudinal bore 33, specifically axially above the orifice of the conduit 74 in terms of Fig. 4. From the annular chamber 82, a high-pressure conduit 84 in turn branches off and communicates with the ~~low-~~
pressure high-pressure connection 24. In the high-pressure conduit 84, there is a throttle restriction 86.

Page 14, please replace paragraph [0047] with the following amended paragraph:

[0047] When the 2/2-way switching valve 64 is opened, the hydraulic control chamber 60 communicates with the low-pressure connection 28. As a result, the pressure in the control chamber 60 drops. Because of the high pressure prevailing the annular chamber 82 (which after all communicates constantly with the high-pressure connection 24 via the high-pressure conduit 84), the switch body 68 now lifts with its sealing edge 76 from the step 78. As a result, on the one hand, the slide edge 72 of the switch body ~~78~~ 68 covers the orifice of the conduit 74, so that the annular chamber 80 is now disconnected from the low-pressure connection 28. Second, as a result, the two annular chambers 80 and 82 are made to communicate with one another, so that both in the annular chamber 80 and in the conduit 42 and the pressure chamber 40, as well as the annular chamber 43, a corresponding high fluid pressure builds up.

Applicant: Peter BOEHLAND et al.
Docket No. R.305609
Preliminary Amendment

Page 17, please add the following new paragraph after paragraph [0055]:

[0056] The foregoing relates to a preferred exemplary embodiment of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.